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RUSSIAN LADS WHO ARE GROWING UP WITH HARBIN

This boom city of Manchuria is only 34 years old. When the Russians came to build the railroad, only one house stood where now rises this colorful, pulsating Moscow of the Far East. It is still Russian in appearance and is the only city in Asia which has nearly as many whites as natives (See Bulletin No. 2).

HOW TEACHERS MAY OBTAIN THE BULLETINS

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Muscle Shoals, "Niagara of the South"

A HUGE power and employment project, described as "probably the widest experiment ever conducted by a government," has been proposed for the Tennessee River watershed. Water power, flood control, reforestation, inland navigation, and the employment of thousands of persons in agriculture and industry are involved in a gigantic plan, which also aims to decentralize or spread out our overcrowded industrial and population centers. The Tennessee River drains approximately 640,000 square miles in five States.

The Tennessee River plan, if successful, will be the first of a series of similar inland developments in other parts of the country, including the watersheds of the Ohio, Missouri, Arkansas and Columbia Rivers.

One Part Already Completed

The most important unit of that part of the Tennessee River plan calling for water-power development is the already completed Wilson Dam at Muscle Shoals, the "Niagara of the South" as far as potential water power is concerned.

Muscle Shoals is off the main highways and railroads and considerably south of the center of population, and is therefore not so well known to traveling Americans as some less important power sites.

The Tennessee River, on which these rapids are situated, is the main tributary of the Ohio River and carries a large volume of water, especially in the spring.

Some of the headwaters of the Tennessee rise in Virginia, and the stream then makes two complete crossings of the State of Tennessee, looping between times into northern Alabama. It is the portion of the river that lies in Alabama that contains Muscle Shoals, a section of rapids 37 miles long. In this short distance the river drops about 130 feet, nearly a third of the entire fall between Chattanooga and the Ohio River.

Plans to improve the Tennessee at Muscle Shoals have been in existence for more than a hundred years. The work was first recommended by the Secretary of War in 1824. This improvement was wholly for the purpose of bettering navigation. Work was actually started in 1831, and a canal with several locks was constructed, but was of small value. Further improvements to help navigation were made up until the World War, when it was decided to harness the river by a power dam and to utilize its electric energy for the production of nitrates to be used in the manufacture of ammunition. The Wilson Dam was begun in 1916 and was not completed until 1925.

600,000 Horsepower Available at Flood Time

This dam is one of the largest in the United States. The river spreads out to a great breadth, so that the dam lacks only about 700 feet of being a mile long. It is approximately 122 feet high to the roadway on top, and contained, at the time of its completion, a greater volume of concrete than any other dam in the world.

Dam and power house have cost, to date, $47,000,000. The power house is situated at the south end of the dam and has foundations which provide for the installation of 18 giant turbines that will produce a maximum of 600,000 horsepower. Of these, eight have been installed and are capable of producing 250,000 horsepower. The maximum at low water will be about 100,000 horsepower.

Since the completion of the Wilson Dam and power house in 1925, the plant has been put to very little use. Some electric energy has been sold to existing power companies, but at no time has it reached maximum production.

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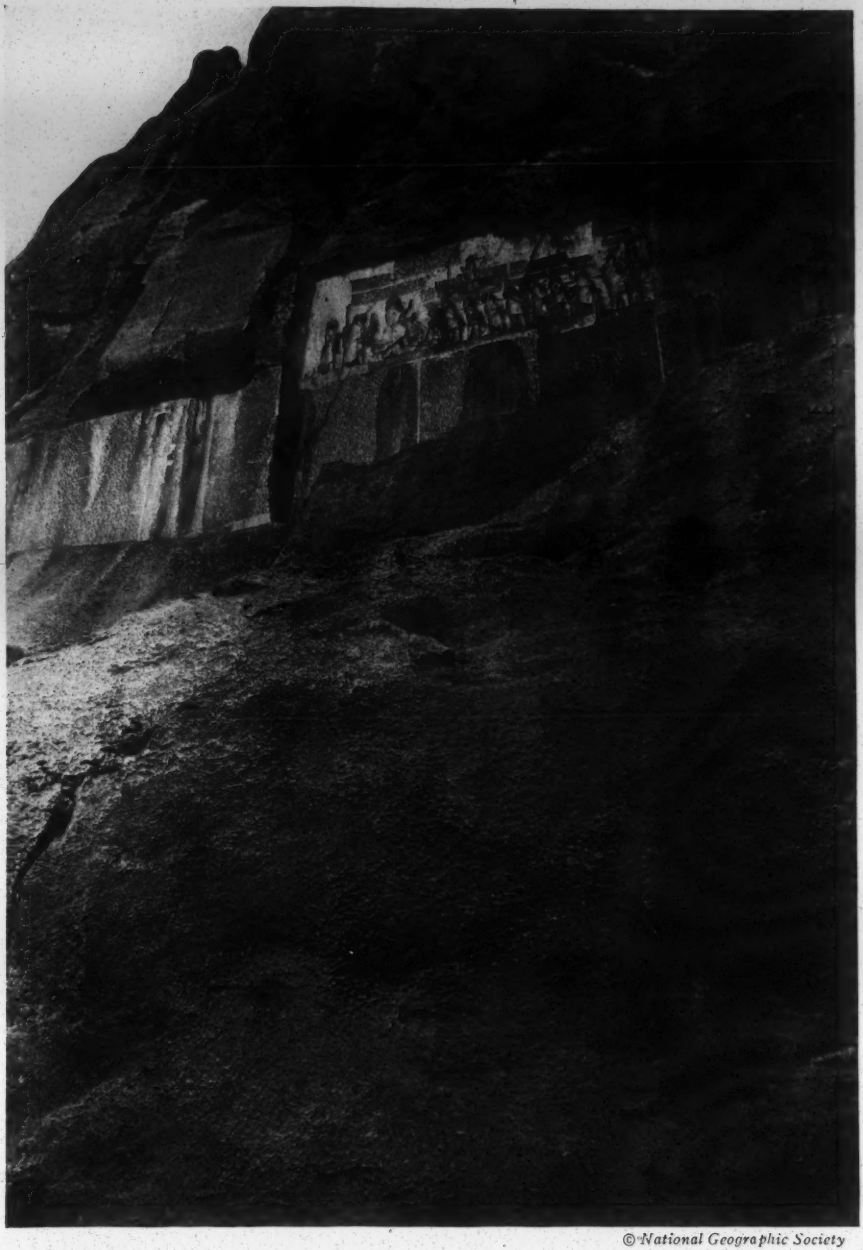

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"HEN TRACKS" ON ROCK THAT REVEALED TWO ANCIENT CIVILIZATIONS

Almost a century has passed since a young English officer scaled the dangerous Behistun Rock near Kermanshah, Persia, and, with the help of a plucky Kurdish boy, obtained copies of inscriptions that proved to be the key to the lost languages and history of Babylonia and Assyria (See Bulletin No. 4).

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News-Hungry Harbin, Manchuria's Second Largest City

HARBIN, second largest city in Manchuria (Manchoukuo), may seem far removed from such centers of journalism as New York's Times Square, or London's Fleet Street, but its residents are hungry for news. A recent news report states that twenty daily newspapers in four languages are published in this city of less than 300,000 population. Our own State of Alabama, by way of comparison, had only twenty daily newspapers in 1932.

Harbin, the operating headquarters of the Chinese Eastern Railway, lies 340 miles north of Mukden, the largest city in Manchuria. It stands where the east-west main line, between Europe and the Pacific, meets the southward extension to Dairen and the Gulf of Chihli, and consequently is one of the most important railroad junctions in the Far East.

Almost as Russian as It Is Chinese

Although Harbin is 200 miles from the nearest border line of Siberia, in territory that was long a part of China, it is almost as Russian as it is Chinese.

In fact, the Russians really put Harbin on the map. Up to the latter part of the "90s," the site of Harbin was a wild, desolate region, with a few fishermen's huts along the Sungari River marking the only human habitation. Then in 1896 Russian builders of the Trans-Siberian Railroad, seeking a short cut to Vladivostok, on the Pacific, obtained a treaty from China which made a line across northern Manchuria possible.

Harbin, however, was only a flag-stop until Chinese interests saw the advantages of an extension southward through central Manchuria. Harbin was chosen as the junction point, the crossing of a giant "T" whose top-bar is 1,090 miles long and whose base stretches 588 miles to Dairen. Manchuria's railroad "T" stands, they say, for trouble, and Harbin has had its share of uprisings—notably during the Russo-Japanese War, and in 1926, 1929, and last year when it was captured by Japanese forces.

The close relationship between Harbin and the Chinese Eastern Railway did not end with the creation of the town along its lines. Until the World War much of the town was on railroad-leased property, hence jointly under the control of Chinese and Russians. Even the telephones of the city were operated by the "Telephone Department" of the railway, and the company also maintained the Greek Catholic Church and the city's largest hospital. It also issued a newspaper in Russian and another in Chinese. Since the World War the company's civic activities have been curtailed, but the railroad still is the most important factor in the economic life of the city.

A City of Four Parts

The Chinese Eastern Railway main line divides the new town from the wharf district of Harbin. On the New Town side, the traveler alights at a fine central station which many American cities would be proud to have. Radiating streets, lined with stone buildings and with gardens and trees, give this part of Harbin the appearance of a European town. In the wharf districts, or "Pristan," gay-colored signs in Chinese and Russian attract the traveler's eye, and carts, droskies, and loaded donkeys struggle through hub-deep mud on the unpaved streets. During

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In connection with the building of the Wilson Dam, the Federal Government constructed two huge factories for the manufacture of nitrates from the nitrogen of the air. The various buildings of one, situated at the town of Sheffield, a few miles down stream from the southern end of the dam, are scattered over more than 1,800 acres of land. It has never been in use. The second, four miles up stream from Sheffield, and close to the end of the dam, occupies a tract of approximately 2,300 acres. It has been operated only on a test basis.

The north end of the Wilson Dam is in the suburbs of Florence, Alabama, a thriving little city of 12,000 inhabitants. Florence is a typical inland Southern town of shaded streets, many of them lined with fine old mansions.

Back water from the dam makes the river navigable for 14 miles up stream, but at this point a shallow stretch occurs. There an auxiliary dam is being built which will make the river navigable to Chattanooga. A small dam, also, has been built several miles down stream from Wilson Dam to make possible the passage of river traffic over the lower end of Muscle Shoals.

Note: For additional references see "Smoke over Alabama," *National Geographic Magazine*, December, 1931; "Reelfoot, an Earthquake Lake," January, 1924; and "Pirate Rivers and Their Prizes," July, 1926. For an additional illustration of the exterior of Wilson Dam see page 46, "Seeing America with Lindbergh," January, 1928.

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SYMBOLS OF THE TIMES, GIANT ELECTRIC GENERATORS AT WILSON DAM

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Maté, a South American Tea That Isn't a Tea

RENEWED fighting in the Gran Chaco, the South American jungle-plain, title to which has been disputed by Bolivia and Paraguay for more than a century, raises a question as to the economic value of the land. Most of the Gran Chaco's wealth comes from its forests as dyewoods, cabinet woods, *quebracho* (a hard timber used in tanning leather) and yerba trees—the latter the source of maté.

What is maté? Spanish students, unfamiliar with the brew of more than 10,000,000 South Americans, might be perplexed by its name, for maté is the Spanish word for gourd.

Also Known as "Jesuit Tea"

When the Spaniards pushed their way into South America a few centuries ago, they found maté a popular beverage among the Indians. The visitors also cultivated a taste for the brew. The Indian name for the leaves from which the beverage was made was "splendid herb." The Spaniards called them yerba (Spanish for herb). The yerba was brewed in a gourd, hence the name *yerba maté*. When its consumers sought to shorten the name, they chose the latter half, and to-day even the encyclopedias and dictionaries define maté as the brew of leaves of a member of the holly tree family in South America.

Paraguay tea and Jesuit tea are two names of the beverage which are often heard by visitors to South America; Paraguay tea, because the yerba tree grows wild in a large part of the country; and Jesuit tea because the Jesuits first cultivated the tree.

Maté has opened up portions of South America that were almost unknown to civilization, because maté companies employ men on long-term contracts to penetrate the interior of the continent. These company settlements often are the only habitations for miles along the Paraguay, Brazilian and Argentine rivers. Here and there the flanking jungle has bowed to the axes of maté collectors. A warehouse is constructed on the water's edge and small thatched houses dot a small clearing beyond.

If the yerba trees are found near-by, the curing process for yerba leaves is done at headquarters, and the camp is an animated area. But often the collectors trek to remote regions and the riverside camp may be deserted for six months at a time. When the "field" workers find a considerable area of yerba trees, they build a thatched shack and form searching parties.

Gourd Is Popular Maté "Cup"

A plot of ground is pounded hard with a mallet and a platform built above it. Meanwhile collectors, axes in hand, hew the branches of glossy leaves of the yerba trees which grow from 12 to 30 feet in height, and bring them to camp. Paths in the remote yerba forests are too narrow for vehicles. Now and then burros are pressed into service but more frequently the collectors carry their own loads. With a huge ball of yerba leaves hiding a collector's head and shoulders, he resembles a walking umbrella tree.

The leaves are deposited on the platform and a fire built underneath. When the leaves are dried, the ashes and fire are cleared away and the leaves dumped on the ground, where they are separated from their branches by beating.

Maté is sipped from tea cups in many cities of South America, but it still is

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the summer months long lines of coolies load river steamers with flour and soy beans from Harbin's busy docks.

Old Harbin, two miles east of the Sungari River, grew up before the railway into southern Manchuria was projected. It was the business center while the railway and the new town were being built, but it is to-day merely a small suburb on the line to Vladivostok.

Downstream from Pristan, and outside the railroad leased land, is the Chinese town, called Fu-chai-tien. The four communities have an aggregate population of about 250,000.

First, Second and Third Class Baths!

Harbin boasts a few good hotels, both Russian and Japanese, but the visitor is impressed with large bath houses where one may take a Russian bath in first, second, or third class compartments. Unless the English-speaking traveler can talk Russian, Chinese, or Japanese, he has difficulty making his wishes known.

In recent years wheat grown in the adjoining prairie country has made Harbin a great grain market.

Note: In the February issue of the *National Geographic Magazine* appears an eye-witness account of the disastrous flood which swept through Harbin last summer. See "Here in Manchuria," February, 1933; "Byroads and Backwoods of Manchuria," January, 1932; and "Manchuria, Promised Land of Asia," October, 1929. For a description of disputed Jehol see "Jehol, New Province in the Manchurian Spotlight," GEOGRAPHIC NEWS BULLETINS, October 10, 1932.

Bulletin No. 2, February 20, 1933.

© *Photograph by Cabot Coville*

WHEN FLOOD WATERS CAME TO HARBIN

Refugees from the disastrous overflow of the Sungari River last summer moving their meager possessions to higher ground. Many of the downtown streets were completely flooded, and Chinese and Japanese soldiers worked side by side rescuing the destitute. Boat owners did a thriving business.

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Behistun Rock, Key to Ancient Persia and Babylonia

THE latest archeological discoveries in Persia, at Persepolis, pronounced "one of the most important in the history of archeological research," have uncovered remarkable art work from the ruins of palaces built in part by Darius the Great.

It was the same Darius who, by an inscription high on a Persian cliff, set the stage for the deciphering of cuneiform writing, a feat first accomplished by Western scholars less than a century ago. (See illustration, page 2.)

Fourteen Years To Solve It

"The key to most that we know about ancient Persia and Babylonia is an inscription in three languages carved 24 centuries ago high on Behistun rock, near Kermanshah," says a communication to the National Geographic Society from Maynard Owen Williams, who studied and photographed the carving when he crossed Asia with the Citroën-Haardt Trans-Asiatic Expedition in 1931. "It was deciphered after 14 years of painstaking study and superhuman detective work by a young British officer, Henry Rawlinson, who entered the service of the Shah just a century ago.

"Not only did the trilingual Behistun inscription give the clue to all cuneiform (wedge-shaped) writing, but it is itself one of the most remarkable of state documents, carved deep in a Persian cliff face for all to see.

"In it Darius the Great shows the reasons for his greatness, records his triumphs over false claimants and rebels, proclaims truth as the essence of kingly conduct, and ascribes his success to the God of Light, Ahura Mazda.

"None have been greater detectives than the archaeologists. Following obscure trails which have been covered for centuries, putting two and two together to make eight, and later proving that they were right, tracing international affairs long since forgotten, the archeologists solve mysteries such as no detective of crime could understand and by so doing have pushed back the horizon of history thousands of years.

One of Two Greatest Clues to the Past

"The two greatest aids to knowledge of ancient times were the Rosetta Stone, opening the way to a knowledge of Egyptology, and the Behistun inscription of Darius, on which is founded our knowledge of all documents recorded with the wedge-shaped characters of cuneiform writing. Champollion and others, in deciphering the Rosetta Stone, had one known language and other data as starting points.

"Sir Henry Rawlinson, who copied and deciphered the Behistun inscription, was faced by three languages, none of which anyone in the world could read—Babylonian, Susian and Old Persian—all inscribed in characters to which this inaccessible inscription formed the best clue.

"The Behistun inscription, hundreds of feet above the caravan trail between Baghdad and Tehran, looks down upon a clear spring at which, for thousands of years, armies and caravans have slaked their thirst. The Citroën-Haardt track-type cars, passing here on their way to Peiping, were watered from a spring known since long before the days of the Magi (see illustration, next page).

A Warning against Liars

"Amid the three inscriptions, Darius, followed by two officers, receives the submission of rebel leaders who had threatened his rule. His foot is on the body

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common to see the beverage sucked from ordinary gourds and elaborately carved and adorned gourd-shaped vessels. The yerba leaves are placed in the gourd, and hot, sweetened water is poured over them. Then the drinker inserts a *bombilla,* or wooden tube, which is used as an American soda-fountain "straw." The *bombilla* has a strainer at the lower end to prevent yerba leaves from entering the mouth.

Maté is one of the outstanding products of two states of southern Brazil. Even in the State of Parana, a coffee-growing region, it is estimated that 44 pounds of maté per capita are consumed annually. In Chile, the popularity of maté is country wide. Chileans consume about 112 pounds per capita; Bolivians 4½ pounds; Argentines, 20 pounds; Paraguayans, 34 pounds; and Uruguayans, 22 pounds.

Note: For supplementary reading about the regions in which maté is a popular beverage see: "Flying the World's Longest Airmail Route," *National Geographic Magazine,* March, 1930; "Buenos Aires to Washington by Horse," February, 1929; "How Latin America Looks from the Air," October, 1927; "Heart of Aymará Land," February, 1927; and "Buenos Aires and Its River of Silver," October, 1921.

Bulletin No. 3, February 20, 1933.

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GAUCHOS OR COWBOYS OF THE ARGENTINE PLAINS

The young lady in the audience is sipping her maté, or Paraguay tea, in the traditional manner—through a tube from a gourd. From the pampas of the south, to the mountains and jungles of the north, maté is as popular a beverage among ten million South Americans as is tea among Englishmen, or coffee among Americans.

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Bayreuth, German City That Opera Built

A MUSIC-LOVING world turns once again to Bayreuth, Germany, as that quaint Bavarian town commemorates this month the 50th anniversary of Richard Wagner's death.

Because Bayreuth possessed the seclusion which Wagner wished, the city now virtually owes its existence to the memory of the great master and his immortal music.

Music Festival Each Summer

Bayreuth each summer ceases to be a "little German town," as thousands of visitors assemble there for the annual Wagner Music Festivals. For two months the Festspielhaus, the theater designed for Wagner, resounds to the strains of "Parsifal" and other of his momentous works, and for those two months Bayreuth is all bustle and stir.

The town's shops carry a complete line of Wagneriana in addition to their regular stock. They show souvenir postcards and photographs of everything relating to the life of Wagner, books about him and his works, and even a newspaper that was published in his behalf—a unique example of a newspaper devoted entirely to one man and his affairs. Shop windows display little busts of Wagner and streets are named for the composer or his operas.

Few visitors leave Bayreuth without first paying tribute before the great slab of marble, unmarked by inscription or design, that covers the master composer's grave. The grave is in the garden of Villa Wahnfried, Wagner's refuge of peace, on Richard-Wagner-Strasse. A few days after Wagner was buried in the tomb which he had prepared, his good friend, King Ludwig II of Bavaria, rode to Bayreuth alone in the dead of night to pay his last respects. Wagner's home is now occupied by his son's wife and her children.

Remote from Traveled Routes

"Wagner City" is just off the route to anywhere. Its very isolation endeared it to Wagner. Many cities offered to do homage to the master's operas as long as there were listeners to hear, but Wagner chose Bayreuth. It lies in mountainous south-central Germany. Scale 40 miles west of the westernmost wedge of Czechoslovakia on the map and you will find it.

Nuremberg is another 40 miles south of Bayreuth. An airplane journey from Nuremberg to the metropolis of Leipzig would take a sky sightseer right over Bayreuth, but the forested mountains that close around it compel the mainline railroad to seek a valley farther east.

Once in Bayreuth, the interest is not in the heart of town but in "the lovely little hill" toward which a broad, tree-bordered boulevard points. The lovely little hill is a perfect setting for the Wagner theater. No other theater in the world is quite like this one. Wagner's aim was to knit drama, stage setting and music in closest unity. Only in this specially-designed auditorium, he believed, could his operas fulfill the ideal of his conception.

Viewed from without, the theater is plain but graceful. Not until one enters do the unusual details of construction become apparent. Seats rise in tiers like those of a Greek theater, leaving no space for balcony or gallery. The orchestra is concealed. Near the theater is a grassy park, which nightly becomes "The Play-

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of Gaumata, the Magian pretender, and before him is Ahura Mazda, God of Light and Righteousness, to whom Darius ascribed his victories. Nine of the captives form an original Ananias Club, for Darius' accusation of each was that he lied.

"The declaration of Darius is remarkable for its directness and objectivity. It is long but definite, and outlines the main features of a successful reign. It ends as follows:

"Thus saith Darius, 'Thou who mayest be king hereafter, beware of lies; the man who is a liar, destroy him utterly. By the grace of Ahura Mazda have I always acted and I call him as witness to the truth of this inscription. I have ruled righteously. Thou who shalt see this tablet and sculptures, destroy them not but preserve them. If not, may Ahura Mazda slay thee and may thy race come to naught.' "

Note: For additional Persian references see "Flying the World," *National Geographic Magazine*, June, 1932; "Flights from Arctic to Equator," April, 1932; "The Citroën-Haardt Trans-Asiatic Expedition Reaches Kashmir," October, 1931; "The World's Greatest Overland Explorer," November, 1928; and "Modern Persia and Its Capital," also "Persian Caravan Sketches," April, 1921.

Bulletin No. 4, February 20, 1933.

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DARIUS PLACED HIS INSCRIPTION WHERE HE KNEW IT WOULD BE SEEN

The age-old caravan route between the Tigris and central Persia passes close to Behistun Rock. This view, from the heights north of Kermanshah, shows that the modern motor caravan has come to travel side by side with donkey trains on the roads of Persia.

ground of the Gods." Wagner's operas are peopled with pagan deities, giants, witches, heroes, heroines, dwarfs, and monsters. Out of the stage doors they pour and into the park during the long intermission as if from a magic box.

Bayreuth, little known before Wagner's residence there, is the capital of the Bavarian State of Upper Franconia. Its workaday industries include spinning and weaving, and the manufacture of machinery, porcelain, and furniture.

Note: For illustrations and descriptions of other Bavarian towns see "Renascent Germany," *National Geographic Magazine*, December, 1928; "The Beauty of the Bavarian Alps," June, 1926; and "Rothenburg, the City Time Forgot," February, 1926. About Germany in general: "Entering the Front Doors of Medieval Towns," March, 1932; and "Flying the World," June, 1932.

Bulletin No. 5, February 20, 1933.

New Supplement to Cumulative Index

Teachers will find useful the 1926-32 supplement to the Cumulative Index of the *National Geographic Magazine* just issued. Unlocking the *National Geographic Magazine's* vast wealth of text, maps, and pictures, this index refers by subject, title, author, country or map to any article or series of illustrations from January, 1926, through December, 1932. It may be obtained for 25 cents (postpaid in the United States) from the Washington, D.C., headquarters of the National Geographic Society.

The Cumulative Index to articles appearing in the *National Geographic Magazine* from 1899 to December, 1925, is also available in paper covered edition (including separate 1926-1932 supplement) at $1.50; cloth covered (including separate 1926-1932 supplement) $2.00, postpaid in the United States and Canada. Mailing abroad, 25 cents extra.

© *Photograph from Ernest Peterfy*

BAVARIAN FARM GIRLS ARE A CHEERFUL LOT

During the decade following the close of the World War all Germany set to work. In this group at a government agricultural school in Miesbach three young ladies of title march to the fields, tools in hand. Sometimes as many as half the students at these schools were the daughters of once wealthy families, or of high officials and army officers.

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